Sector-Specific Guide

Mining

DRAFT 2008–2009

Contents

A. Overview 2

B. Advantages of Earning a Specialist High Skills Major (SHSM) in Mining 3

C. Required Components for the SHSM–Mining 5

D. Pathways for the SHSM–Mining 13

E. Occupations in the Mining Sector 17

F. Postsecondary Programs and Training Related to Careers in the Mining Sector 19

G. Resources 21

H. Appendices 24

Une publication équivalente est disponible en français sous le titre suivant :
Majeure Haute Spécialisation, Guide de la majeure en exploitation minière.

This publication is available on the Ministry of Education's website, at www.edu.gov.on.ca.

A. Overview

The Specialist High Skills Majors (SHSM), launched in September 2006, are part of the Student Success Strategy initiative, which focuses on expanding quality learning opportunities and supporting success for all students. The SHSM is a ministry-approved specialized program that allows students to focus their learning on a specific economic sector while meeting the requirements for the Ontario Secondary School Diploma (OSSD). This career-focused program is also designed to help prepare students to make the transition from secondary school to apprenticeship training, college, university, or the workplace. An SHSM enables students to gain sector-specific skills and knowledge in the context of engaging, career-related learning environments and helps them focus on graduation and on pursuing their postsecondary goals.

The ministry has published the *Specialist High Skills Major Implementation Guide*, as well as sector-specific guides, like this one, for each of the SHSM economic sectors. Boards and schools are strongly encouraged to refer to the *SHSM Implementation Guide* along with the SHSM sector-specific guides when planning and implementing an SHSM. In addition, teachers will find resources, templates, and forums for discussion on the SHSM e-Community website, at http://community.elearningontario.ca (a password-protected site for educators).

This guide provides information about the five required components of the SHSM–Mining, sample pathways for the SHSM, examples of postsecondary programs in the sector, and a list of resources that may be helpful to both teachers and students involved in the program.

B. Advantages of Earning a Specialist High Skills Major (SHSM) in Mining

According to the Mining Industry Human Resources Council,* over the next ten years there will be a shortage of 92 000 workers in the mining and minerals sector. The shortage will be especially critical in the following occupations: physical scientists, engineers, technicians/technologists, skilled trades, mine labourers, and support staff. The anticipated demand is a result of industry growth, retirements (especially in the skilled trades), competition for labour from other economic sectors, and the challenges of recruiting young people into mining occupations. Jobs in the industry offer competitive wages, benefits, and advancement opportunities.

The SHSM–Mining enables students to build a foundation of sector-focused knowledge and skills before graduating and entering apprenticeship training, college, university, or an entry-level position in the workplace.

Pursuing the Specialist High Skills Major–Mining enables students to:

- customize their secondary school education to suit their interests and talents while meeting the requirements for the OSSD;
- select a bundle of 9 required credits focused on sector-specific knowledge and skills that are:
  - valued by the mining sector and postsecondary educational institutions;
  - designed to help prepare students for a postsecondary opportunity of their choice in this economic sector;
  - designed with the flexibility to allow students to shift between pathways (e.g., switch from a pathway leading to college to an apprenticeship pathway) or to discontinue the SHSM program should their career plans change in Grade 11 or 12;
- provide evidence of achievement of the required components of the SHSM (e.g., sector-recognized certifications) for prospective employers and postsecondary educational institutions;
- explore, identify, and refine career goals and make informed decisions about their postsecondary options;
- take part in "reach ahead" that will help them gain confidence in their ability to be successful, refine skills and work habits, and make an informed choice about future careers and next steps;

* From the Council's website, at www.mihr.ca. Retrieved February 2007.

- identify and develop Essential Skills and work habits that are required in the sector, using tools connected with the Ontario Skills Passport;
- access resources, equipment, and expertise that may not be available in their secondary school.

C. Required Components for the SHSM–Mining

Required Components for the SHSM–Mining

1. a bundle of 9 Grade 11 and Grade 12 credits that includes:
   i) 4 mining major credits that provide sector-specific knowledge and skills;
   ii) 3 other required credits from the Ontario curriculum, in English, mathematics, and science or Canadian and World Studies, in which some expectations are met through learning activities contextualized to the mining sector;
   iii) 2 cooperative education credits that provide authentic learning experiences in a workplace setting, enabling students to refine, extend, apply, and practise sector-specific knowledge and skills
2. 7 sector-recognized certifications and/or training courses/programs (4 compulsory and a choice of 3 electives from a list of additional certifications and training courses/programs)
3. experiential learning and career exploration activities within the sector
4. "reach ahead" experiences connected with the student's postsecondary pathway
5. development of Essential Skills and work habits required in the sector, and use of the Ontario Skills Passport (OSP) for purposes of documentation

Students who complete the requirements for the OSSD and for the SHSM will receive an OSSD with the SHSM seal. Credits earned towards the SHSM are indicated on the provincial report card, and completion of the SHSM is recorded on the Ontario Student Transcript (OST). In addition, all students who participate in the SHSM program will receive an SHSM Record, which documents their achievement of the required components of the SHSM.

The five required components for an SHSM diploma designation are designed to give students a rich and varied range of curriculum-based and experiential learning experiences, as a foundation for making a successful transition to their chosen postsecondary education or training program or occupation.

Local circumstances, such as facilities and equipment, staff qualifications, partnerships, and agreements, determine how the SHSM's required components can be offered to students. Depending on these circumstances, the components may be delivered in a secondary school, college, training centre, other approved site, or a combination of these delivery settings. See the *SHSM Implementation Guide* for more information on delivery models.

No substitutions for any of the five required components of an SHSM are permitted.

1. Bundled Credits

Each SHSM has a bundle of credits that consists of major credits, other required credits, and cooperative education credits. The bundle for the SHSM–Mining consists of:

i) 4 major credits;

ii) 3 other required credits;*

iii) 2 cooperative education credits.

The credits in the bundle prepare students for one of four postsecondary options – apprenticeship training, college, university, or the workplace.

i) Major credits

Each SHSM has four major credits that enable students to build a foundation of sector-focused knowledge and skills. The major credits may be:

- credits for Ontario curriculum courses;
- credits for ministry-approved locally developed courses (LDCs); or
- dual credits, which are subject to their own policies and procedures.

ii) Other required credits

In addition to the major credits, each SHSM includes *other required credits* from the Ontario curriculum. (In the SHSM–Mining, the other required credits are in English, mathematics, and science or Canadian and World Studies.) These courses are delivered by the teachers of the required subjects and involve the use of contextualized learning activities (CLAs), which enable students to connect their learning in these courses to their SHSM sector. CLAs are based on curriculum expectations from the required course. One or more CLAs must be incorporated into each required course. (A CLA template is provided in Appendix A.)

iii) Cooperative education credits

Cooperative education provides authentic learning experiences in a workplace setting that enable students to refine, extend, apply, and practise the sector-specific knowledge and skills acquired in the bundle of credits. Each SHSM requires that students complete a minimum of two credits in cooperative education related to the major credits. (More than two credits are recommended, if the student's timetable permits.)

Students may earn their minimum of two cooperative education credits in Grade 11 and/or Grade 12, as a single credit in each grade or a double credit in one grade. Students in the university pathway, however, are advised to complete their cooperative education credits in Grade 11, in order to allow room in their timetables in Grade 12 for credits needed to meet university entrance requirements. Depending on local circumstances, students may have to complete their cooperative education credits through continuing education, in the summer, or through virtual cooperative education. See *Cooperative Education and Other Forms of Experiential Learning: Policies and Procedures for Ontario Secondary Schools, 2000*, and Appendix B, Part A in this guide.

* SHSMs in other sectors may require 2, 3, or 4 "other" credits. For details, see the other sector-specific guides.

- **The bundle of credits for every SHSM offered by a school must be approved by the Ministry of Education.**
- **No substitutions for the credits in the approved bundle are permitted.**
- **No changes are permitted in the grade level of required credits for an SHSM, as identified in the sector-specific guides.**

Summary of the Required Credits in the Bundle for the SHSM–Mining

The 9 required credits in the bundle for the SHSM–Mining are identified in the table below. No substitutions for the credits in the bundle are allowed, and the credits must be at the specified grade level. School boards are required to submit for ministry approval their proposed pathway chart for each SHSM offered by their schools, indicating the credits in each bundle by pathway. Once a credit bundle is approved, the board may not change any of the credits in the bundle for that school year.

Students may earn their minimum of two cooperative education credits in Grade 11 and/or Grade 12, as a single credit in each grade or a double credit in one grade. Students in the university pathway, however, are advised to complete their cooperative education credits in Grade 11, in order to allow room in their timetables in Grade 12 for credits needed to meet university entrance requirements. Depending on local circumstances, students may have to complete their cooperative education credits through continuing education, in the summer, or through virtual cooperative education. See *Cooperative Education and Other Forms of Experiential Learning: Policies and Procedures for Ontario Secondary Schools, 2000.*

Required Credits in the Bundle for the SHSM–Mining

Credits		Apprenticeship Training		College		University		Workplace	
		Gr. 11	Gr. 12	Gr. 11	Gr. 12	Gr. 11	Gr. 12	Gr. 11	Gr. 12
Mining Major*		2	2	2	2	2	2	2	2
"Other required credits" (with CLAs)	English		1		1		1		1
	Mathematics	1			1		1	1	
	Science or Canadian and World Studies	1		1		1		1	
Cooperative Education		2		2		2		2	
Total number of credits		9		9		9		9	

* Multiple credits in the Ontario technological education curriculum allow additional instructional time for the practice and refinement of skills needed to develop student performance to the levels required for certification, entry into apprenticeship programs, or participation in school–work transition programs (see *The Ontario Curriculum, Grades 11 and 12: Technological Education, 2000*, page 6).

A pathways chart is given on page 15, showing subjects and courses that students could take to explore the SHSM in mining in Grades 9 and 10, and courses they would have to take in Grades 11 and 12 to complete this specialized program. Sample bundles of credits that would meet the requirements for the SHSM–Mining are provided in the chart on page 16.

A student's course selections must take into account entrance requirements for the postsecondary education or training program, apprenticeship program, or job that the student hopes to enter.

2. Sector-Recognized Certification and Training

Sector-recognized certifications and training courses/programs, including those addressing safety, are important for students who are working towards the SHSM and provide them with an advantage when they are entering the workforce, whatever their chosen career goal may be.

Certification and training courses/programs (including online courses/programs) must:

- be delivered by a person (who may be a teacher) who is certified by the certification provider as a trainer or recognized by the sector as an authority. Online courses/programs must be from a recognized certification provider. (These requirements do not apply to WHMIS.);
- include an assessment and/or evaluation component;
- include, wherever possible, documentation such as a certificate or other proof of completion for the student's portfolio and the student's SHSM Record. The SHSM Record will indicate the title of each certification earned or training course/program completed, the number of hours involved, and the date the certification/training was completed.

The SHSM in mining requires students to complete seven (7) sector-recognized certifications and/or training courses/programs. Of these, four (4) are compulsory and the remaining three (3) are electives that must be chosen from the list in the following chart. *Note that items in the chart that are capitalized are the* proper names *of specific certifications or training courses/programs that are appropriate for the SHSM. Items that are lowercased are names of the areas or categories within which specific certification or training courses/programs should be selected by the school or board.* The requirements are summarized below.

SHSM–Mining: Sector-Recognized Certification and Training

Four (4) compulsory			
Standard First Aid	Cardio-Pulmonary Resuscitation (CPR), Level A	General Safety Awareness (GSA)	generic (i.e., not site-specific) instruction about the Workplace Hazardous Materials Information System (WHMIS)
Three (3) electives from the list below			
certified GPS training, including map and compass	chain saw safety	confined space awareness	electrical safety
elevating work platforms	fall protection	hoisting and rigging	lift truck safety
lock out and tagging	personal protective equipment in mining	powder-actuated tools	radio operator
surface miner and underground orientation	suspended access equipment	trenching safety	

Boards and schools may provide opportunities for students to complete additional training.

No substitutions for items in the above lists or changes in the *number* of required certifications and training courses/programs are permitted.

3. Experiential Learning and Career Exploration Activities

Experiential learning and career exploration activities that fulfil the SHSM requirement are planned learning activities that take place outside the traditional classroom setting and relate to the sector of the SHSM. These activities, which can include job shadowing, job twinning, worksite tours, and attendance at career conferences or competitions (see Appendix B, Part B), enable students enrolled in the SHSM to explore careers in the sector. Students will benefit from the opportunity to reflect on the activity afterwards, either through a discussion or an assignment.

Experiential learning and career exploration activities give students opportunities to explore, observe, participate in, and reflect on a variety of sector-specific experiences and careers. They also enable students to increase their awareness of, and develop, the Essential Skills

and work habits required in the sector, and have their demonstration of those skills and habits documented, using tools connected with the Ontario Skills Passport. An experiential assignment or task could require students to identify examples of how the Essential Skills are applied in specific trades and administrative and management occupations (e.g., estimator, safety officer) in a mining business.

Experiential learning opportunities could include:

- one-on-one observation of a cooperative education student at a placement in the mining sector (example of job twinning);
- a day-long observation of a skilled tradesperson in the mining sector (example of job shadowing);
- a one- or two-week work experience with a member of an industry association or a professional in the sector (example of work experience);
- a field trip to an industry site;
- attendance at a conference or symposium related to the mining sector;
- participation in a *Mine Rescue* competition;
- attendance at an orientation to engineering day at a university to promote careers in engineering.

Cooperative education is also a form of experiential learning. However, for the purposes of the SHSM program requirements and the student's SHSM Record, the two cooperative education credits must be counted as part of the SHSM bundled credit requirement.

Experiential learning placements for students must be arranged by the school and must meet the following requirements:

- A placement must be assessed by a teacher before the student is assigned to it to ensure that the placement offers a positive learning environment and a safe workplace. (*See Cooperative Education and Other Forms of Experiential Learning: Policies and Procedures for Ontario Secondary Schools*, 2000. Available online at www.edu.gov.on.ca/eng/document/curricul/secondary/coop/cooped.pdf.)
- Workplace Safety and Insurance Board coverage must be in place through the ministry or the workplace. (See Policy/Program Memorandum No. 76A, September 27, 2000; excerpted in Appendix B of the *SHSM Implementation Guide*.)

Career exploration activities must also be arranged by the school. Preparation for these activities should include a review of the learning goals, activity protocols, and workplace health and safety requirements.

For more information consult *Live Safe! Work Smart! Appendix for Cooperative Education and Other Forms of Experiential Learning*, at www.livesafeworksmart.net/english/coop/coop_appdx.htm.

For a summary of the regulations governing age requirements for working in and/or visiting workplaces in Ontario, see Appendix C.

4. "Reach Ahead" Experiences

"Reach ahead" experiences provide students with an opportunity to experience the next step in their chosen pathway (e.g., an experience in a workplace setting for a student who has chosen a workplace pathway; a college-related experience for a student who has chosen a college pathway). Reach ahead experiences take place outside the classroom and vary in length. The experience should be followed by a debriefing, an assignment, or a task that enables students to reflect on their chosen destination.

The following are examples of "reach ahead" experiences in the various pathways:

- *Apprenticeship training pathway:* Visiting an approved apprenticeship delivery agent to investigate a program of interest to the SHSM student.
- *College pathway:* Interviewing a college student enrolled in a program of interest to the SHSM student, in order to learn about that program.
- *University pathway:* Observing a university class in the SHSM student's program of interest.
- *Workplace pathway:* Interviewing an employee in the field of work that the SHSM student is considering.

5. Development of Essential Skills and Work Habits, and Use of the Ontario Skills Passport (OSP) for Purposes of Documentation

The Ontario Skills Passport (OSP) is a bilingual web-based resource that provides a common language for describing the Essential Skills and work habits important for work, learning, and life. Essential Skills are the generic skills used in virtually all occupations and all facets of daily life, and include Reading Text, Writing, Document Use, Oral Communication, Money Math, and Finding Information. Human Resources and Social Development Canada (HRSDC) has identified and validated the Essential Skills. Essential Skills enable people to perform tasks required in their jobs and to participate fully in the workplace and the community. They provide the foundation for learning other skills, such as technical skills and job- or workplace-specific skills, and they help people adjust to change. The OSP also includes important work habits such as working safely, teamwork, reliability, and initiative. The Essential Skills and work habits described in the OSP are included in the chart below.

Essential Skills	Work Habits
• Reading Text • Writing • Document Use • Computer Use • Oral Communication *Numeracy* • Money Math • Scheduling or Budgeting and Accounting • Measurement and Calculation • Data Analysis • Numerical Estimation *Thinking Skills* • Job Task Planning and Organizing • Decision Making • Problem Solving • Finding Information	• Working Safely • Teamwork • Reliability • Organization • Working Independently • Initiative • Self-Advocacy • Customer Service • Entrepreneurship

Sector representatives consulted on the development of the SHSMs emphasized the importance of the Essential Skills and work habits. Essential Skills and work habits are transferable from school to work or to further education or training, as well as from job to job and sector to sector. The OSP provides sample tasks for each skill and work habit in work, learning, and life contexts, and details how workers use Essential Skills on the job. The OSP offers tools that help students build confidence and competence and make connections between their studies at school and their prospective careers.

Students use the OSP to learn about Essential Skills and work habits, occupation-related tasks, and careers relevant to the SHSM. SHSM teachers provide students with opportunities to use the OSP tools to practise and build their Essential Skills and work habits. Students, in their SHSM cooperative education program, will create an OSP Work Plan related to their goals, interests, and particular SHSM sector, in which their employer (that is, their placement supervisor) may assess and record the Essential Skills and work habits that the student demonstrates. It would be beneficial for students to create a skills-based résumé, in preparation for interviews and meetings with employers, that clearly indicates their attainment of Essential Skills and work habits. Students can also use the OSP Tracker to plan opportunities for skills development during high school and after graduation.

The OSP website (http://skills.edu.gov.on.ca) offers resources for the use of the OSP in SHSM programs.

D. Pathways for the SHSM–Mining

This section contains the following:

- ideas that schools and boards can use to promote awareness and exploration of the SHSM–Mining among students and parents, and to help students as they make the decision to specialize in this program
- a chart showing a pathways template for completing the SHSM–Mining
- a chart that contains sample bundles of credits for the SHSM–Mining

Strategies for Promoting and Suggestions for Planning the SHSM–Mining

Grades 7 and 8: Awareness

The following are examples of strategies that boards and schools can use to build Grade 7 and 8 students' awareness of the SHSM program:

- Organize field trips, competitions, and activities in the community that are specific to the SHSM.
- Host presentations or talks on careers with guest speakers and mentors from the sector.
- Hold a summer program sponsored by the sector before students enter secondary school.
- Organize experiences at a secondary school in the program related to this sector.
- Invite current or graduate SHSM students to share their experiences.
- Profile SHSMs at Grade 8 parent nights.

Grades 9 and 10: Exploration

Many of the strategies listed above would also help Grade 9 and 10 students begin to explore pathways planning and SHSM programs. In addition, the school board's SHSM lead could be invited to present information about the SHSM programs offered at the board's schools, and those programs could be profiled on the school and/or board websites. Displays could be set up for parent nights at the school to inform parents about the benefits of SHSM programs. Activities such as Take Our Kids to Work day also provide opportunities for students to explore careers in sectors that interest them.

Students who are considering pursuing the SHSM–Mining can be encouraged to enrol in the following courses to become better informed about careers and postsecondary options related to the mining sector:

- Integrated Technologies: A Grade 9 course recommended for all SHSM pathways that have a technological education focus. It provides students with opportunities to explore a variety of technologies, including mining technology, by engaging in activities related to them.
- Career Studies (compulsory) and the Discovering the Workplace: Some of the expectations in these Grade 10 courses provide opportunities for students to explore occupations and other postsecondary options in the sector and to participate in experiential learning activities.
- Transportation Technology or Technological Design: Recommended for any Grade 10 student who is considering entering an SHSM–Mining.

Grades 11 and 12: Specialization

Students acquire the sector-specific knowledge and skills required to earn their OSSD with an SHSM–Mining by completing its five required components. Students and their parents/guardians are encouraged to consult with guidance counsellors and teachers to select the courses that will enable them to pursue their goals.

Students pursuing an apprenticeship pathway should consider the Ontario Youth Apprenticeship Program (OYAP), which enables them to start an apprenticeship while earning their OSSD (see Appendix B, Part C).

Students pursuing a university pathway are advised to complete their required cooperative education credits in Grade 11, in order to allow room in their timetables in Grade 12 for credits needed to meet university entrance requirements.

When helping students plan their SHSMs, particularly with respect to the selection of courses to fulfil the "major credits" requirement, teachers should bear in mind that technological education courses can be offered as single-credit or multiple-credit courses.

Pathways Template for the SHSM–Mining

- Shaded boxes – required credits in the bundle for the SHSM–Mining
- (C) – compulsory credits for the OSSD

Grade 9 *Exploration*	**Grade 10** *Exploration*	**Apprenticeship Training Pathway** *Specialization*		**College Pathway** *Specialization*		**University Pathway** *Specialization*		**Workplace Pathway** *Specialization*	
		Grade 11	**Grade 12**	**Grade 11**	**Grade 12**	**Grade 11**	**Grade 12**	**Grade 11**	**Grade 12**
An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit
(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English
(C) Mathematics	(C) Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	Mathematics
(C) Science	(C) Science	(C) An optional or a compulsory credit *in either Gr. 11 or Gr. 12*	Science or Canadian and World Studies *in either Gr. 11 or Gr. 12*	(C) An optional or a compulsory credit *in either Gr. 11 or Gr. 12*	Science or Canadian and World Studies *in either Gr. 11 or Gr. 12*	(C) An optional or a compulsory credit *in either Gr. 11 or Gr. 12*	Science or Canadian and World Studies *in either Gr. 11 or Gr. 12*	(C) An optional or a compulsory credit *in either Gr. 11 or Gr. 12*	Science or Canadian and World Studies *in either Gr. 11 or Gr. 12*
(C) Geography of Canada	(C) Canadian History	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**
(C) Core French	(C) Career Studies/ Civics	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**	**Mining Major**
(C) Healthy Active Living Education	(C) The Arts	May be used as a (C) Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12*		May be used as a (C) Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12*		May be used as a (C) Cooperative education (2 credits) related to major credits, *recommended in Gr. 11*		May be used as a (C) Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12*	
Integrated Technologies	Transportation Technology or Technological Design	An optional or a compulsory credit	An optional or a compulsory credit or Cooperative Education	An optional or a compulsory credit	An optional or a compulsory credit or Cooperative Education	Science	Mathematics	An optional or a compulsory credit or Cooperative Education	An optional or a compulsory credit or Cooperative Education

Sample Bundles of Credits for the SHSM–Mining

- Shaded boxes – required credits in the bundle for the SHSM–Mining
- (C) – compulsory credits for the OSSD
- The letters C, E, M, O, and U at the end of course codes indicate the following types of courses: C – college preparation; E – workplace preparation; M – university/college preparation; O – open; U – university preparation

Apprenticeship Training Pathway		**College Pathway**		**University Pathway**		**Workplace Pathway**	
Grade 11	**Grade 12**	**Grade 11**	**Grade 12**	**Grade 11**	**Grade 12**	**Grade 11**	**Grade 12**
An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit
(C) ENG3C English	(C) ENG4C English	(C) ENG3C English	(C) ENG4C English	(C) ENG3U English	(C) ENG4U English	(C) ENG3E English	(C) ENG4E English
(C) MCF3M Functions and Applications	MCT4C Mathematics for College Technology	(C) MCF3M Functions and Applications	MCT4C Mathematics for College Technology	(C) MCR3U Functions	MHF4U Advanced Functions	(C) MEL3E Mathematics for Work and Everyday Life	MEL4E Mathematics for Work and Everyday Life
SNC3M Science	SPH4C Physics	CGF3M Physical Geography: Patterns, Processes, and Interactions	SPH4C Physics	SCH3U Chemistry	SPH4U Physics	SNC3E Science	CGR4E The Environment and Resource Management
Mining Major SGM38 (LDC)*	**Mining Major** TTJ4C *or* TTJ4E Transportation Technology	**Mining Major** SGM38 (LDC)*	**Mining Major** SCH4C Chemistry	**Mining Major** SGM38 (LDC)*	**Mining Major** SCH4U Chemistry	**Mining Major** SGM38 (LDC)*	**Mining Major** TTJ4E Transportation Technology
Mining Major TTJ3C *or* TTJ3E Transportation Technology	**Mining Major** TTJ4C *or* TTJ4E Transportation Technology	**Mining Major** TDJ3M Technological Design *or* TTJ3C Transportation Technology	**Mining Major** TDJ4M Technological Design *or* TTJ4C Transportation Technology	**Mining Major** TDJ3M Technological Design	**Mining Major** TDJ4M Technological Design	**Mining Major** TTJ3E Transportation Technology	**Mining Major** TTJ4E Transportation Technology
May be used as a (C) **Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12***		May be used as a (C) **Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12***		May be used as a (C) **Cooperative education (2 credits) related to major credits, *recommended in Gr. 11***		May be used as a (C) **Cooperative education (2 credits) related to major credits, *in either Gr. 11 or Gr. 12***	
CGT3E Geographics: The Geographer's Toolkit	SCH4C Chemistry	SNC3M Science	CGO4M Geomatics: Geotechnologies in Action	SPH3U Physics	MCV4U Calculus and Vectors	CGT3E Geographics: The Geographer's Toolkit	Cooperative Education

* For an outline of this course, see Appendix D.

E. Occupations in the Mining Sector

The National Occupational Classification (NOC) is a system that describes and classifies all occupations in Canada using four-digit codes called National Occupation Codes (NOCs). This system and the codes are the authoritative source for occupational information in Canada. Entering one of these four-digit codes in the "Quick Search" box on the NOC website (www5.hrsdc.gc.ca/NOC-CNP) provides occupational information related to that career.

For more information on occupations:

- go to the Ontario Skills Passport website (http://skills.edu.gov.on.ca)
- click on "Occupations and Tasks" in the navigation bar
- select "Sorted by NOC", and
- click on the "Sample Workplace Tasks" checkmark for one of the occupations to view a description of the occupation, an overview of the Essential Skills required in the occupation, a list of sample tasks for the occupation, and assessment tools and other career and employment information related to the occupation.

The following are examples of occupations in the mining sector, with corresponding NOC codes, sorted according to the type of postsecondary education or training the occupations would normally require.

Note: Some of the names of occupations given below may differ slightly from the names in the NOC. The names listed here reflect common usage by institutions and organizations in this sector in Ontario.

Apprenticeship Training • Electrician 7242 • Heavy Duty Equipment Mechanic 7312 • Industrial Mechanic 2433 • Machinist 7231	**College** • Geological Technician 2212 • Instrumentation Technician 2243 • Mechanical Engineering Technologist 2232 • Mine Development Technologist 2212 • Mining Technician 2212

University
• Geologist 2113
• Mechanical Engineer 2132
• Mining Engineer 2143
	Workplace
	• Control and Process Operator 9231
	• Geology Technical Assistant 2212
	• Heavy Duty Equipment Operator 7421
	• Mechanic's Helper 7612
	• Mine Labourer 8614
	• Sampler 9415
	• Underground Mine Service and Support Workers 8411
	  • Cage Tender
	  • Crusher Operator

F. Postsecondary Programs and Training Related to Careers in the Mining Sector

The following are examples of programs and training related to careers in the mining sector and the accreditations or types of accreditation each results in:

Apprenticeship Training

Heavy Duty Equipment Mechanic	Certificate of Apprenticeship/ Certificate of Qualification
Mechanic	Certificate of Apprenticeship/ Certificate of Qualification

College

Electrical Engineering Technician – Industrial	Diploma
Mining and Environment – Regulations and Compliance	Bachelor's degree
Mining Engineering Technology	Advanced diploma
Mining Science and Management	Bachelor's degree

University

Earth Sciences – Geology	Bachelor's degree
Geological Engineering	Bachelor's degree
Geology	Bachelor's degree
Metallurgical Control Analyst	Bachelor's degree
Metallurgical Engineer	Bachelor's degree
Mining Engineering	Bachelor's degree

Training for the Workplace

Flux Cored Arc Welding	Certificate
Gas Metal Arc Welding	Certificate
Mechanical Techniques – CNC/CAD/CAM Specialist	Certificate
Mechanical Techniques – Design	Certificate
Mechanical Techniques – Mining	Certificate
Mining Techniques	Certificate
Welding Techniques	Certificate

G. Resources

Associations and Other Professional Groups

Alliance of Sector Councils	www.councils.org
Canadian Institute of Mining, Metallurgy and Petroleum	www.cim.org
Conference Board of Canada	www.conferenceboard.ca
International Technology Education Association (ITEA)	www.iteaconnect.org
Mining Association of Canada	www.mining.ca
Mining Industry Human Resources Council	www.mihr.ca
Ontario Cooperative Education Association	www.ocea.on.ca
Ontario Council for Technology Education (OCTE)	www.octe.on.ca
Ontario Mining Association	www.oma.on.ca
Ontario School Counsellors' Association	www.osca.ca
Prospectors and Developers Association of Canada	www.pdac.ca
Skills Canada	www.skillscanada.com
Skills Canada–Ontario	www.skillsontario.com

Careers

Apprenticeship Search	www.apprenticesearch.com
Canada Job Futures	www.jobfutures.ca
Career Cruising	www.careercruising.com
CBC Learning	www.cbclearning.ca
Employment Ontario	www.Ontario.ca/employmentontario
Job Bank	www.jobbank.gc.ca
Labour Market Information	www.labourmarketinformation.ca
Ontario Prospects	www.ontarioprospects.info
Ontario Skills Passport (OSP)	http://skills.edu.gov.on.ca

Ontario WorkInfoNet	www.onwin.ca
Statistics Canada	www.statcan.ca
Youth Opportunities Ontario	www.youthjobs.gov.on.ca

Education/Government

Applications of Working and Learning National Project	www.awal.ca
Centre for Excellence in Mining Innovation	www.cemi.laurentian.ca/Laurentian/Home/Departments/CEMI
Federal Resources for Educational Excellence	www.free.ed.gov
Human Resources and Social Development Canada	www.hrsdc.gc.ca
Independent Learning Centre	www.ilc.org
Industry Canada	www.ic.gc.ca
Ministry of Natural Resources	www.mnr.gov.on.ca
Mining Industry Human Resources Council	www.mihr.ca
Ministry of Education	www.edu.gov.on.ca
Ministry of Labour	www.labour.gov.on.ca
Ministry of Research and Innovation	www.mri.gov.on.ca
Ministry of Small Business and Consumer Services	www.ontariocanada.com/ontcan/sbcs_index.jsp
Ministry of Training, Colleges and Universities (MTCU)	www.edu.gov.on.ca/eng/tcu
Natural Resources Canada	www.nrcan.gc.ca
Ontario College Application Service	www.ontariocolleges.ca
Ontario Universities' Application Centre	www.ouac.on.ca
Ontario Youth Apprenticeship Program	www.oyap.com
Passport to Prosperity	www.edu.gov.on.ca/passport
Prospectors and Developers Association of Canada Mining Matters	www.pdac.ca/miningmatters
Towes: How Do Your Skills Measure Up? Skill Plan	http://measureup.towes.com

Safety, Training, and Certifications

Canada Safety Council (CSC)	www.safety-council.org
Canadian Centre for Occupational Health and Safety (CCOHS)	www.ccohs.ca
Canadian Red Cross Society	www.redcross.ca

Industrial Accident Prevention Association (IAPA)	www.iapa.ca
Interprovincial Standards Red Seal Program	www.red-seal.ca
Lesson Plans for the Trades	www.khake.com/page82.html
Lifesaving Society	www.lifesaving.ca
Live Safe! Work Smart!	www.livesafeworksmart.net
Mines and Aggregates Safety and Health Association	www.masha.on.ca
NORCAT	www.norcat.org
Passport to Safety	www.passporttosafety.com
Prevention Dynamics	www.preventiondynamics.com
Rescue 7 (First Aid)	www.rescue7.ca
St. John Ambulance	www.sja.ca
Virtual WHMIS	www.virtualwhmis.com
Workplace Safety and Insurance Board (WSIB)	www.wsib.on.ca

H. Appendices

Appendix A: Contextualized Learning Activities (CLAs) for the Specialist High Skills Majors

For the "other required credits" in the bundle of credits, students in a Specialist High Skills Major program must complete learning activities that are contextualized to the knowledge and skills relevant to the economic sector of the SHSM. Contextualized learning activities (CLAs) address curriculum expectations in these courses.

CLAs must take a minimum of 6 hours and a maximum of 10 hours to complete. Boards may choose to develop one activity that takes 6–10 hours to complete, or two or more activities that together take a minimum of 6 hours and a maximum of 10 hours to complete.

This template must be used to describe the CLAs. The completed form must be submitted to the Ministry of Education.

CLAs will be posted on the SHSM e-Community website, at http://community.elearningontario.ca (a password-protected site for educators).

Contextualized Learning Activity (CLA) Template

- *Submit all material in Microsoft Word.*
- *When selecting materials for use in connection with the CLA(s), be sure to observe all current copyright regulations (see Access Copyright – The Canadian Copyright Licensing Agency, at www.accesscopyright.ca).*

Note to CLA developers: *Please remove any instructions and coloured text from the boxes before completing the template for submission. (The coloured text is provided to assist you in your planning.)*

Contact Information

Board: _____

Development date: _____

Contact person: _____

Position: _____

Phone: ( ) _____ - _____ Fax: ( ) _____ - _____

E-mail: _____

Specialist High Skills Major	
Course code and course title	
Name of contextualized learning activity/activities	
Brief description of contextualized learning activity/activities	
Duration	*(The CLA(s) must take a minimum of 6 hours and a maximum of 10 hours to complete.)*

(continued)

Appendix A *(continued)*

Overall expectations	*(Identify the overall expectation(s) from the Ontario curriculum to be assessed and evaluated through the CLA(s). Include the relevant strand title(s).)*
Specific expectations	*(Identify the specific expectations related to the above overall expectations that will be addressed in the instructional and assessment strategies. Include the relevant strand titles.)* Consider the following as part of your planning: ***What do we want students to learn?*** • *What are the specific/key learning goals related to these expectations?* • *Are these specific/key learning goals arranged in a way that will allow students to achieve the desired learning incrementally?*
Catholic graduate expectations (if applicable)	
Essential Skills and work habits from the OSP	*In the list below, check off the Essential Skills and work habits that are addressed in the CLA(s).* **Essential Skills** ❑ *Reading Text* ❑ *Writing* ❑ *Document Use* ❑ *Computer Use* ❑ *Oral Communication* *Numeracy* ❑ *Money Math* ❑ *Scheduling or Budgeting and Accounting* ❑ *Measurement and Calculation* ❑ *Data Analysis* ❑ *Numerical Estimation* *Thinking Skills* ❑ *Job Task Planning and Organizing* ❑ *Decision Making* ❑ *Problem Solving* ❑ *Finding Information* **Work Habits** ❑ *Working Safely* ❑ *Teamwork* ❑ *Reliability* ❑ *Organization* ❑ *Working Independently* ❑ *Initiative* ❑ *Self-advocacy* ❑ *Customer Service* ❑ *Entrepreneurship*

Instructional/Assessment Strategies

Teacher's notes *(Provide suggestions that will assist the teacher in delivering the CLA(s). For example, remind teachers to make sure that handouts, such as authentic workplace materials/documents used by the sector, are available for the activity.)*

Context *(Describe the workplace context for the activity/activities.)*

Strategies *(In point form, describe the sequence of instructional and assessment strategies that will support the intended learning.)*

How will the learning be designed?

- *Do the instructional strategies support the achievement of the learning goals?*
- *Are the assessment strategies linked to each of the instructional strategies in a planned, purposeful, and systematic way?*
- *Do the assessment and instructional strategies provide for feedback and ongoing monitoring of the student's learning throughout the CLA?*
- *How will teachers differentiate instruction and assessment to meet the learning needs of students?*

What adjustments must be made to the instructional and assessment strategies for students who are not showing progress in their learning?

Assessment and Evaluation of Student Achievement

(List all assessment and evaluation strategies and tasks based on the strategies identified in the preceding section. ***Attach handouts, tests, assignments, exercises, etc.)***

As you plan, please keep the following important considerations in mind:	
How will we know students are learning?	**How will we know students have learned?**
• *How will students demonstrate progress towards the desired learning?*	• *How will students demonstrate achievement of the desired learning?*
• *What criteria will be used to determine whether students are learning?*	• *What criteria will be used to determine that students have learned?*
• *What assessment strategies/tools will best gather evidence of progress?*	• *What assessment strategies/tools will best gather evidence that students have learned?*
• *Will the assessment tasks provide opportunities for students to demonstrate the full range of their learning in a variety of ways?*	

Strategies/Tasks *(add rows as required)*	**Purpose** *Assessment for Learning (diagnostic, formative)* *Assessment of Learning (summative, evaluation)*
1.	
2.	
3.	

Assessment tools

(List all tools used and attach checklists, rubrics, correction keys, etc.)

Additional Notes/Comments/Explanations

(Provide additional suggestions for teachers that will help them deliver the CLA(s).)

Resources

(List all the resources needed to support the implementation of the CLA(s).)

Authentic Workplace Materials *(e.g., blueprints, workplace manuals, specification sheets, spreadsheets)*

Human Resources

Print

Video/DVD

Software

Websites

Other

Accommodations

(List instructional, environmental, and assessment accommodations.)

What adjustments must be made to the instructional and assessment strategies to accommodate different learning needs?

List of Attachments

(Attach all related materials, e.g., student worksheets, tests, rubrics.)

Appendix B: Fact Sheets

A. Cooperative Education Fact Sheet

All Ontario cooperative education programs have specific requirements, which include the following.

Pre-course interview

The purpose of this initial interview with the student applicant is to ensure that:

- the student is ready to undertake learning in the workplace, and is taking, will be taking, or has taken a course that is related to the proposed cooperative education placement (where a student's readiness or commitment is not sufficiently evident, his or her acceptance into the cooperative education program may be postponed until the requirements are met);
- barriers to success in the workplace are identified, and appropriate supports can be put in place (e.g., assistive devices, job coaches);
- there is a placement that is appropriate to the student's goals and interests.

Establishment of the placement

Placements for students must be arranged by the school and must meet the following requirements:

- A placement must be assessed by a teacher before the student is assigned to it to ensure that the placement offers a positive learning environment in a safe workplace.
- It is not general practice for a cooperative education student to receive remuneration for work done in a placement, since the emphasis is on learning. However, provided that all the criteria for the cooperative education program are met, a board may permit a cooperative education student in a specialized program (e.g., a re-entry program) or in a particular placement (e.g., a unionized environment) to receive payment.
- A placement must have Workplace Safety and Insurance coverage through the ministry or the workplace (see Policy/Program Memorandum No. 76A, September 27, 2000).

Pre-placement instruction

A minimum of fifteen hours of instruction must be provided on:

- workplace health and safety (for resources, see www.livesafeworksmart.net and www.passporttosafety.com);
- employment law, unions, workplace ethics, human rights, and confidentiality.

Personalized placement learning plan (PPLP)

A PPLP must be developed for each student. It must be:

- based on expectations from the related course in the Ontario curriculum, the requirements for cooperative education, and industry-specific requirements;
- developed by the cooperative education teacher in partnership with the employer and student (where the cooperative education teacher is not qualified in the related subject or the student has an Individual Education Plan, the cooperative education teacher will consult with the appropriate subject or special education teacher).

Samples of PPLPs are available at www.edu.gov.on.ca.

Assessment and evaluation

A qualified teacher must assess and evaluate a student's progress in achieving the curriculum expectations and in meeting the requirements identified in the student's PPLP through regular workplace monitoring meetings (a minimum of three per credit). During workplace monitoring, the teacher will:

- observe student performance of workplace tasks, plan next steps, and troubleshoot problem situations;
- conduct formal evaluations with the student's supervisor.

Student achievement is also assessed through:

- written assignments, seminar presentations, reflective journals, and career portfolios;
- a culminating independent-study activity that links the student's cooperative education placement experience with the curriculum expectations of the related course;
- a minimum of two performance appraisals written by the placement supervisor.

Teachers are encouraged to ask employers to use the Ontario Skills Passport Work Plan to assess and record a student's demonstration of Essential Skills and work habits (see http://skills.edu.gov.on.ca).

In-school integration sessions

In-school sessions of a minimum of seven hours per credit provide students with opportunities to:

- analyse and share their workplace experience;
- relate the placement experience to the curriculum expectations;
- reinforce the job-skills theory acquired in the classroom and the skills, techniques, and principles learned and applied at the placement.

B. Experiential Learning and Career Exploration Fact Sheet

Experience	Description	Key Requirements
Career Exploration Activities	• Activities that allow students to explore career opportunities through worksite tours, career conferences or competitions (e.g., Skills Canada), simulation activities (e.g., Junior Achievement), or contact with a career mentor • May be incorporated into any credit course • Count towards the Experiential Learning and Career Exploration component required for an SHSM	• Preparation for every activity, including review of learning expectations, activity protocols, and workplace health and safety • Opportunity for students to reflect on the activity • Completed field trip form and transportation agreement
Job Shadowing 1/2 to 1 day (in some cases up to 3 days)	• One-on-one ***observation*** of a worker at a place of employment • May be incorporated into any credit course • Counts towards the Experiential Learning and Career Exploration component required for an SHSM	• Teacher selection of an appropriate placement in a safe work environment • Preparation for the placement, including review of learning expectations, activity protocols, and workplace health and safety • Opportunity for students to reflect on the experience • Completed field trip form and transportation agreement • WSIB coverage if placement is more than 1 day
Job Twinning 1/2 to 1 day	• One-on-one ***observation*** of a cooperative education student at his or her placement • May be incorporated into any credit course • Counts towards the Experiential Learning and Career Exploration component required for an SHSM	• Pairing of a student with a cooperative education student • Preparation for the placement, including review of learning expectations, activity protocols, and workplace health and safety • Opportunity for students to reflect on the experience • Completed field trip form and transportation agreement
Work Experience/ Virtual Work Experience* 1–4 weeks	• A planned learning opportunity that provides students with a relatively short-term work experience. Virtual work experience is facilitated through the use of communications technology at the school. • May be incorporated into any credit course • Counts towards the Experiential Learning and Career Exploration component required for an SHSM	• Placement assessment • Pre-placement instruction addressing job-readiness skills, placement expectations, and workplace health and safety • Opportunity for students to reflect on the experience • Development of a learning plan • Monitoring of student's work at actual or virtual site at least once during the experience (*recommended*) • WSIB coverage

* See the Virtual Cooperative Education Fact Sheet at www.edu.gov.on.ca/eng/teachers/studentsuccess/expansion.html for information on accessing employers.

C. Ontario Youth Apprenticeship Program (OYAP)

How does the Ontario Youth Apprenticeship Program (OYAP) benefit students?

By participating in OYAP, students:

- gain on-the-job training and experience in an apprenticeship in a skilled trade while earning credits towards the Ontario Secondary School Diploma (OSSD);
- accumulate workplace hours that count towards both secondary school co-op credits and the requirements of an apprenticeship program;
- may have an opportunity to receive Level 1 apprenticeship in-school training or be eligible to write an exemption test for Level 1;
- if enrolled in a ministry-approved dual credit program, may earn optional credits towards their OSSD for Level 1 apprenticeship in-school training.

How do students participate in OYAP?

- To participate in OYAP, students must be at least sixteen years old and have accumulated a minimum of 16 credits towards their OSSD. An OYAP student earns cooperative education credits for work experience in an apprenticeship occupation.
- In some cases, employers may formally register students as apprentices with the Ministry of Training, Colleges and Universities (MTCU).
- Students may have the opportunity to be enrolled in Level 1 apprenticeship in-school training, delivered by a community college or another MTCU-approved training facility, OR may be eligible to write a Level 1 exemption test upon successful completion of a multiple-credit secondary school technological education course.
- A student may participate in OYAP as part of a Specialist High Skills Major (SHSM) program (see the *Specialist High Skills Major Implementation Guide* and the SHSM guides for individual sectors, at www.edu.gov.on.ca/eng/teachers/studentsuccess/specialist.html).

Placement considerations

When arranging placements for OYAP students, cooperative education teachers should:

- ensure that a certified journeyperson is available at the placement to provide the student with on-the-job training that conforms to the MTCU-approved Training Standards of the trade;
- draw on the Training Standards of the trade when developing the student's Personalized Placement Learning Plan (PPLP);
- emphasize trade-specific health and safety training in the student's PPLP, and make the placement supervisor aware of its importance;
- confirm with the placement supervisor that the student will have ongoing supervision at any worksite associated with the placement where he or she is performing tasks that are in the PPLP;
- ensure that the placement supervisor is aware of any accommodations that must be put in place for English language learners and/or students with special education needs.

Programming considerations

Cooperative education teachers planning programs for OYAP students should take into account that:

- Workplace Safety and Insurance Board coverage does not apply to students during the time they are receiving training at a community college or other training facility;
- hours spent completing training at a community college or other training facility do not count towards the workplace hours required for co-op credits.

Resources

- Health and safety: www.livesafeworksmart.net; www.passporttosafety.com
- Apprenticeship information: www.apprenticesearch.com; www.tradeability.ca; www.ilc.org
- School board websites

Appendix C: Minimum Age to Work in and Visit Ontario Workplaces[1]

Specialist High Skills Major[2]	Type of Workplace	Minimum Age to Work	Minimum Age to Visit / Conditions for Visiting[3]
• Arts and Culture • Business • Community Safety and Emergency Services • Health and Wellness • Hospitality and Tourism • Information and Communications Technology	Industrial establishments,[4] such as offices, stores, arenas, restaurant serving areas	14	The regulation governing industrial establishments (Reg. 851, R.R.O. 1990) made under the OHSA sets out minimum age restrictions for workers, covering workplaces such as offices, stores, arenas, restaurants, and factories. However, the regulation states that people younger than the specified minimum age to work may *visit* (but not *work in*) these establishments if: • they are accompanied by a person who has attained the age of majority (i.e., 18 years of age); • they are being guided on a tour of the industrial establishment (e.g., office, store, arena, or factory); • they are in an area of the industrial establishment used for sales purposes; or • they are in an area of the establishment to which the public generally has access.
• Business • Community Safety and Emergency Services • Hospitality and Tourism • Information and Communications Technology • Manufacturing • Transportation	Most factories,[5] including restaurants and any commercial kitchens, automotive service garages, produce and meat preparation or shipping and receiving areas in grocery stores, laundries, and warehouses	15	
• Forestry	Logging operations[6]	16	
• Construction • Community Safety and Emergency Services • Information and Communications Technology	Construction project[7]	16 Under the regulation governing construction projects (O. Reg. 213/91) made under the OHSA, 16 is the minimum age to work on *or* to visit *any* construction project. A person under the age of 16 may *visit* a construction site *only when work is not being performed there*. (Note that the definitions of *construction* and *construction project* include a wide variety of types of work and workplaces. It is important to review the definitions carefully. See note 7, below.)	

All notes appear on pages 36–38.

(continued)

Appendix C *(continued)*

Specialist High Skills Major[2]	Type of Workplace	Minimum Age to Work	Minimum Age to Visit / Conditions for Visiting[3]
• Mining	Surface mines,[8] mining plants[9] Underground mine Working face of a surface mine	16 18 18	The regulation governing mines and mining plants (Reg. 854, R.R.O. 1990) made under the OHSA allows for tours or visits to mines and mining plants by persons who are younger than the specified minimum age to work if they are accompanied by and under the direction of a guide.
• Agriculture • Arts and Culture • Community Safety and Emergency Services • Environment • Health and Wellness • Horticulture and Landscaping • Information and Communications Technology	Certain workplaces (or parts thereof) may be covered, with respect to age restrictions, by regulations governing other sectors. For example, see the industrial establishments regulation (Reg. 851, R.R.O. 1990).		
• Construction • Manufacturing	Window cleaning	18	*Not applicable.* (The regulation governing window cleaning is Reg. 859, R.R.O. 1990.)

Notes to Appendix C

1. As specified in regulations made under the Occupational Health and Safety Act (OHSA). Other statutes and regulations made under those statutes also set minimum ages for various occupations.

   In addition, some workplaces have established their own, *more stringent* minimum ages for employment. For instance, some retail establishments and restaurant chains will not hire anyone under the age of 16, even though the legislated minimum age limit is lower. Similarly, some industrial establishments, and other workplaces that require the use of heavy equipment or machinery, will not hire anyone under the age

of 18, even though the legislated minimum age limit might be lower. Such in-house minimum age requirements may be acceptable, as long as the limits do not conflict with the Ontario Human Rights Code or other applicable law.

2. Column 1 identifies the Specialist High Skills Majors with which the workplace categories in column 2 may be associated. Note, however, that some specialist programs may involve workplaces identified in more than one category (e.g., a business program may involve offices, factories, and construction sites). When using this chart to verify compliance with minimum age to work and visit requirements, always refer to the particular type of workplaces involved in the program (column 2), not to the sector to which the program relates (column 1).

3. Under certain conditions, as identified in this table, persons younger than the minimum age to work may visit, *but not work in*, certain workplaces.

4. According to the OHSA, ***industrial establishment*** means an office building, factory, arena, shop or office, and any land, buildings and structures appertaining thereto.

5. According to the OHSA, ***factory*** means

   a) a building or place other than a mine, mining plant or place where homework is carried on, where,

      i) any manufacturing process or assembling in connection with the manufacturing of any goods or products is carried on,

      ii) in preparing, inspecting, manufacturing, finishing, repairing, warehousing, cleaning or adapting for hire or sale any substance, article or thing, energy is,

         (A) used to work with any machinery or device, or

         (B) modified in any manner,

      iii) any work is performed by way of trade or for the purposes of gain in or incidental to the making of any goods, substance, article or thing or part thereof,

      iv) any work is performed by way of trade or for the purposes of gain in or incidental to the altering, demolishing, repairing, maintaining, ornamenting, finishing, storing, cleaning, washing or adapting for sale of any goods, substance, article or thing, or

      v) aircraft, locomotives, or vehicles used for private or public transport are maintained,

   b) a laundry including a laundry operated in conjunction with,

      i) a public or private hospital,

      ii) a hotel, or

      iii) a public or private institution for religious, charitable or educational purposes, and

   c) a logging operation.

6. According to the OHSA, ***logging*** means the operation of felling or trimming trees for commercial or industrial purposes or for the clearing of land, and includes the measuring, storing, transporting or floating of logs, the maintenance of haul roads, scarification, the carrying out of planned burns and the practice of silviculture.

7. According to the OHSA, ***construction*** includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, land clearing, earth moving, grading, excavating, trenching, digging, boring, drilling, blasting or concreting, the installation of any machinery or plant, and any work or undertaking in connection with a project but does not include any work or undertaking underground in a mine.

   Project means a construction project, whether public or private, including,

   a) the construction of a building, bridge, structure, industrial establishment, mining plant, shaft, tunnel, caisson, trench, excavation, highway, railway, street, runway, parking lot, cofferdam, conduit, sewer, water main, service connection, telegraph, telephone or electrical cable, pipe line, duct or well, or any combination thereof,

   b) the moving of a building or structure, and

   c) any work or undertaking, or any lands or appurtenances used in connection with construction.

8. According to the OHSA, ***mine*** means any work or undertaking for the purpose of opening up, proving, removing or extracting any metallic or non-metallic mineral or mineral-bearing substance, rock, earth, clay, sand or gravel.

9. According to the OHSA, ***mining plant*** means any roasting or smelting furnace, concentrator, mill or place used for or in connection with washing, crushing, grinding, sifting, reducing, leaching, roasting, smelting, refining, treating or research on any substance mentioned in the definition of "mine" (see note 8, above).

Appendix D: Locally Developed Course

Course Outline for SHSM–Mining, Workplace Preparation – SGM3S

Board: Rainbow District School Board
Prerequisite: none
Discipline/Subject: Science

Course Description

This course provides students with an overview of the mining industry from the geological processes involved in the discovery of an ore body to the extraction and refining of products. Students obtain an understanding of the economics that drive mine development and the environmental impact of mine development. Students gain a better understanding of the mining processes through hands-on activities, presentations by guest speakers, and participation in topic appropriate field trips. Students will also obtain a number of certifications required for the Specialist High Skills Major–Mining.

Curriculum Learning Expectations

A. Mineral Exploration, Geoscience, Discovery, and Mine Development – 22 hours

Overall Expectations

Students will:

- demonstrate an understanding of the formation, characteristics, and uses of the major types of rocks and minerals and identify and describe the stages of the Mine Life Cycle (exploration, development, closure, and reclamation);
- gather geologic data using geo-technologies and tools (e.g., maps, remote sensing imagery, aerial photographs, satellite images, geographic information systems [GIS]) common in geological exploration and mine development;
- explain the steps involved in mine development and their impact (e.g., social, environmental, economic) on local communities.

B. Mining Methods, Mineral Processing, and Extraction Methods – 30 hours

Overall Expectations

Students will:

- identify and describe various surface and underground mining methods and explain how they are selected;
- demonstrate an understanding of the principles of ore processing and metal extraction;
- describe mine layouts for open-pit and underground mining and identify their components;
- explain the processes involved in the mining cycle and how the cycle differs for open-pit and underground mining.

C. Mine Impact on Environment, Economics, and Future Sustainability – 30 hours

Overall Expectations

Students will:

- demonstrate an understanding of mining's impact on the environment, the global economy, and future sustainability and of the steps taken in environmental planning for the different stages of mine operation and mine closure;
- identify environmental protection requirements and processes and the role of economics during all stages of the Mine Life Cycle;
- identify pertinent legislation and practices related to mine rehabilitation and mine closure, and demonstrate an understanding of ethics and social responsibility in the business of mining.

D. Health and Safety Certifications – 20 hours

Overall Expectations

Students will:

- develop an understanding of health and safety legislation as it relates to mining;
- demonstrate an awareness of safe work habits and the Occupational Health and Safety Act and Regulations;
- identify and acquire a number of certifications pertinent to the mining industry (e.g., Workplace Hazardous Materials Information System [WHMIS]), Fall Protection, General Safety Introduction – Surface Miner and Underground Orientation).

E. Careers and Entrepreneurship – 8 hours

Overall Expectations

Students will:

- identify careers in the mining industry and the education and training each requires;
- develop a venture plan for a mining-related business;
- identify key job skills required to be successful in mining or a mining-related business.

Assessment and Evaluation

Formative assessments provide valuable feedback for students prior to summative achievement of expectations being recorded for reporting purposes.

Term	Final
• 70% • summative only • based on achievement chart categories • all categories weighted 20–35%	• 30% • based on achievement chart categories • towards the end of the course

Ministry of Education
08-080

Printed on recycled paper

ISBN 978-1-4249-7748-2 Print
ISBN 978-1-4249-7749-9 PDF

© Queen's Printer for Ontario, 2008